WHAT IS CLAIMED IS:

1. A precision polishing element, comprising:

a substantially rigid support member having an outer perimeter for cooperating with a tool, said outer perimeter terminating at one end in a mounting surface;

a polishing member mountable to said mounting surface of said substantially rigid support member, said polishing member having a plurality of spaced compliant polishing portions, nearest adjacent ones of said plurality of spaced compliant polishing portions being separated by a recessed portion, said recessed portion forming a fluid transport region when nearest adjacent compliant polishing portions are in compressive contact with a surface to be polished.

2. The precision polishing element recited in claim 1 wherein said polishing member has a substantially toroidal shape.

3. The precision polishing element recited in claim 1 wherein said polishing member has a substantially polygonal shape.

4. The precision polishing element recited in claim 1 wherein said polishing member has a substantially star-like shape having irregularly configured lobes.

5. The precision polishing element recited in claim 1 wherein said polishing member has a continuous groove formed in a circumferential portion thereof.

6. The precision polishing element recited in claim 1 wherein said compliant polishing member comprises a material selected from the group consisting of an elastic solid material, a polymeric material, and a mixture thereof.

7. The precision polishing element recited in claim 6 wherein said polymeric material is selected from the group consisting of: polyurethane, chloroprene, fluorocarbon, fluorosilicone, ethylene propylene, and nitrile.

8. The precision polishing element recited in claim 7 wherein said polymeric material is nitrile.

9. The precision polishing element recited in claim 1 wherein said substantially rigid support member is mounted to said polishing member by chemical bonding.

10. The precision polishing element recited in claim 1 wherein said substantially rigid support member is mounted to said polishing member by thermal bonding.

11. The precision polishing element recited in claim 1 wherein said substantially rigid support member is mounted to said polishing member by mechanical bonding.

12. The precision polishing element recited in claim 1 wherein said substantially rigid support member is mounted to said polishing member by direct molding.

13. The precision polishing element recited in claim 1 wherein each of said plurality of spaced compliant polishing portions has a Shore A hardness in the range of about 40-95.